

## The Knowledge Bank at The Ohio State University

### Ohio State Engineer

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# MAKING RESEARCH PAY

PHIL DUNSON, E.E. IV

Although each year more than \$200,000,000 is spent for research carried on in this country, and although more than 30,000 are employed in research enterprises, the advances resulting from this widespread activity are not as far-reaching as they might be if the findings of research workers were better disseminated among those in positions to make use of the findings.

Several organizations may work simultaneously on almost identical problems, all totally unaware of the activities of the others or of a previous solution by still another investigator, of a problem virtually the same as those now engaging their attention. If the answer is not a trade secret, whose divulgence would be detrimental to the original investigator, it is advantageous for all concerned to have it. Because instances of needless duplication of research are numerous, a "clearing house for research" known as the Research Advisory Service was organized to remedy the situation.

## **The Beginnings of the Research Advisory Service**

The plan provides for the cooperation of more than nine hundred of America's outstanding research laboratories in solving the technical problems of manufacturers and for better correlating supply and demand by locating the company that has what another needs. Most of the laboratories are maintained by national industries; others are associated with universities, technical schools, or trade associations, or are maintained by private engineering firms.

Before the Research Advisory Service was established, its proponents consulted many leading scientists and engineers, seeking their opinions of its feasibility and enlisting their cooperation. For several years laboratories were visited and their activities, insofar as they could be disclosed, were studied, listed, and cross-indexed under specific headings. These files are now kept up-to-date by continual revision and expansion as more laboratories are added to the number cooperating in the service. An advisory staff thus acquainted with the work of the various research laboratories routes each problem to one or more of the particular laboratories most likely to have pertinent information at hand.

## **The R.A.S. in Operation**

Obtaining assistance in a problem involves only a simple procedure and incurs no expense or obli-

gation. The seeker of information reduces his problem to writing, including all of the details likely to be relevant to the working out of the most satisfactory answer. He tells what steps he has taken, what sources he has contacted in his attack of the problem, so that others need not repeat what already has been accomplished. He sends this information, together with any samples applying to the problem, to one of the nineteen banks offering the Research Advisory Service.

The material pertaining to the problem is sent to one or more of the laboratories which have offered their assistance, and when information considered to be of interest to the inquirer is obtained it is forwarded to him. Often the reply consists of several preliminary reports plus a final report in order that some of the facts may be utilized while still other channels are being explored.

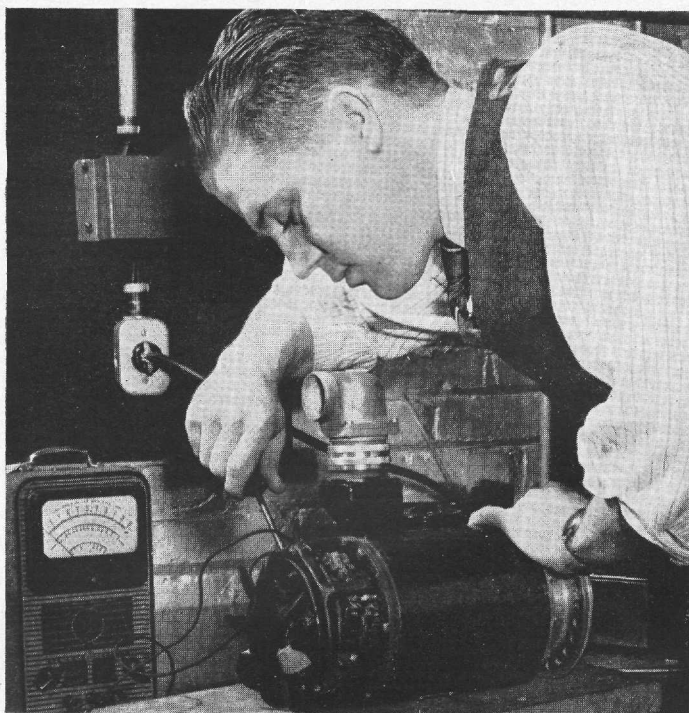
If he so desires, the inquirer remains anonymous to the laboratories from which information is obtained, while if the report indicates that further information from some of the laboratories might be helpful, he may contact them directly.

## **Limitations of the R.A.S.**

Many problems, of course, have not yet been solved, so the service does not guarantee, or even intimate, that every problem submitted will be adequately answered. Other problems, while solvable, cannot be reduced to writing, or require the presence and study of a consulting engineer "on the ground". The service is not intended to replace consulting engineers, and makes not attempt to deal with such problems. As one might reasonably expect, the banks themselves do not engage in any of the research, but merely play the role of a contact or clearing service. The service does not attempt to uncover trade secrets. In several instances, however, a manufacturer has assumed that a process was a secret one and has been asked a high price for the "privilege" of using the process, only to learn through the Research Advisory Service that several companies have used it and that the manufacturer need not pay to obtain the process.

## **Typical Problems**

Problems submitted to the Research Advisory Service can be classified into six general types: how to do it, which is better, what to use as a substitute, where to get it, where to sell waste



Courtesy General Electric

● Working on airplane generator

materials, and general information. An insight into the functioning of the service can be gained from two typical problems and their answers:

### Finding a Substitute

**Problem:** Since latex cement is no longer available for the manufacture of shoes, we would like to know whether any satisfactory substitutes have been developed for this purpose.

Laboratory No. 1 (fully identified). For side lasting, we have developed a satisfactory adhesive which we would be very glad to demonstrate to your client.

We are also working on a similar cement for toe lasting, and have two promising possibilities. Of course, thermoplastic cements could be used for this purpose, but they require specialized equipment which is now difficult to obtain.

Laboratory No. 2 (fully identified). We have developed an elastic cement that may be suitable for this purpose. Its characteristics are similar to latex and has quick break and high film strength. This material also has superior adhesion and better heat resistance and aging than latex, although its film strength is somewhat lower.

Laboratory No. 3 (fully identified). We have developed a cement which is especially suitable for the job you mention. This product has about the same viscosity as latex and is made of a combination of materials which our suppliers have assured us we will be able to obtain without any difficulty.

### Selling Waste Materials

**Problem:** We have several hundred thousand

pounds of wool, rayon, and cotton waste, which is composed of fibers too short to be spinnable. We would like to know if there is any market for this waste material.

Source No. 1 (fully identified). We may be able to use this material and would appreciate receiving samples of the same for further study.

Source No. 2 (fully identified). If you will advise your client to send us samples of this material with details as to the quantity that accumulates of each grade, it may be that we would be able to find a market for the same.

Source No. 3 (fully identified). We are large users of this type of material and would appreciate having your client send us a representative sample of it.

### The Reading Service

The service compiles information concerning the material appearing in nearly three hundred technical, scientific, and business periodicals. Clients wishing to know what articles have appeared on any particular subject can write for bibliographies prepared by The Reading Service.

### A Timely Survey

The Research Advisory Service asked America's outstanding industrial leaders the question, "What new product, process or material might industrial research develop that would be valuable to YOUR industry?". In his booklet, "Industry's Challenge to Research", Bert H. White, director of the service, has summarized the responses to this question. No date appears on the booklet, but it was published before the United States formally entered the war. Many of the desired developments still are important, however, especially those listed here, which have been indicated by Dr. Thomas Midgley, Jr., Vice-Chairman of the National Inventors Council, as being urgently needed in connection with the war effort (then "national defense"). Incidentally, Dr. Midgley is nationally known as the inventor of ethyl gasoline. Some of the developments already have been achieved, or are now receiving attention in laboratories throughout the country, others, are well beyond the immediate grasp of the researcher.

### Important Research Objectives

#### Adhesives

Cement for quickly bonding rubber and metal.

#### Aeronautics

A procedure for dispelling fogs locally over airports.

Material to which ice would not adhere, for use on airplane wings, highway surfaces, windshields, etc.

Improvements in methods of aircraft construction such as flush riveting or spot welding to achieve absolutely smooth external surfaces without introducing serious maintenance problems.

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## RESEARCH OBJECTIVES

(Continued from page 8)

### Agriculture.

The leading drying oil of the paint and varnish industry is linseed which is extracted from flaxseed. Flax is grown in the northwest portion of this country and in California, but for the major portion of our requirements we are dependent on the Argentine. Next in importance to linseed oil is China wood oil, or tung oil, which comes from tung nuts found primarily in the interior of China. I can think of no greater contribution that research can make to the paint and varnish industry than to work out ways and means of giving us the products that we need, made exclusively from domestic oils.

### Ceramics

More uniform grades of foundry molding sand, probably synthetic.

A satisfactory filling material for expansion joints in concrete highways and the joints in brick and block pavements is badly needed.

### Chemicals

The waterproofing of linseed oil or other paint vehicle would prevent much of the corrosion of metals, the blistering of paint and other failures of metal protective coatings.

Alkyd resins are dependent on the price of glycerine. What the paint and varnish industry needs is a synthetic method of producing glycerine that would keep the price low.

A process whereby materials, such as lumber, etc., used in building would be made non-inflammable.

### Electrical Equipment

A spark plug that is not subject to burning of the points under conditions of full load engine operation and yet will not foul under idling conditions.

Efficient storage battery without a corrosive electrolyte, that requires no attention, for use on automobiles.

### Fuel

A device to take the waste heat energy from exhaust gases and utilize it for jet propulsion at very high speeds, thereby adding to the performance of aircraft by the utilization of power now wasted.

### Glass

A transparent, colorless, isotropic, homogeneous medium, having the same refractive index for all wave lengths. This would be a glass which could refract without dispersion. Such a material would permit very great improvement in optical instruments and would make possible other undreamed of researches.

Improved glass suitable for 1500 pound boiler water level gage.

### Instruments

Greater accuracy in seismograph instruments and seismograph surveying in connection with petroleum.

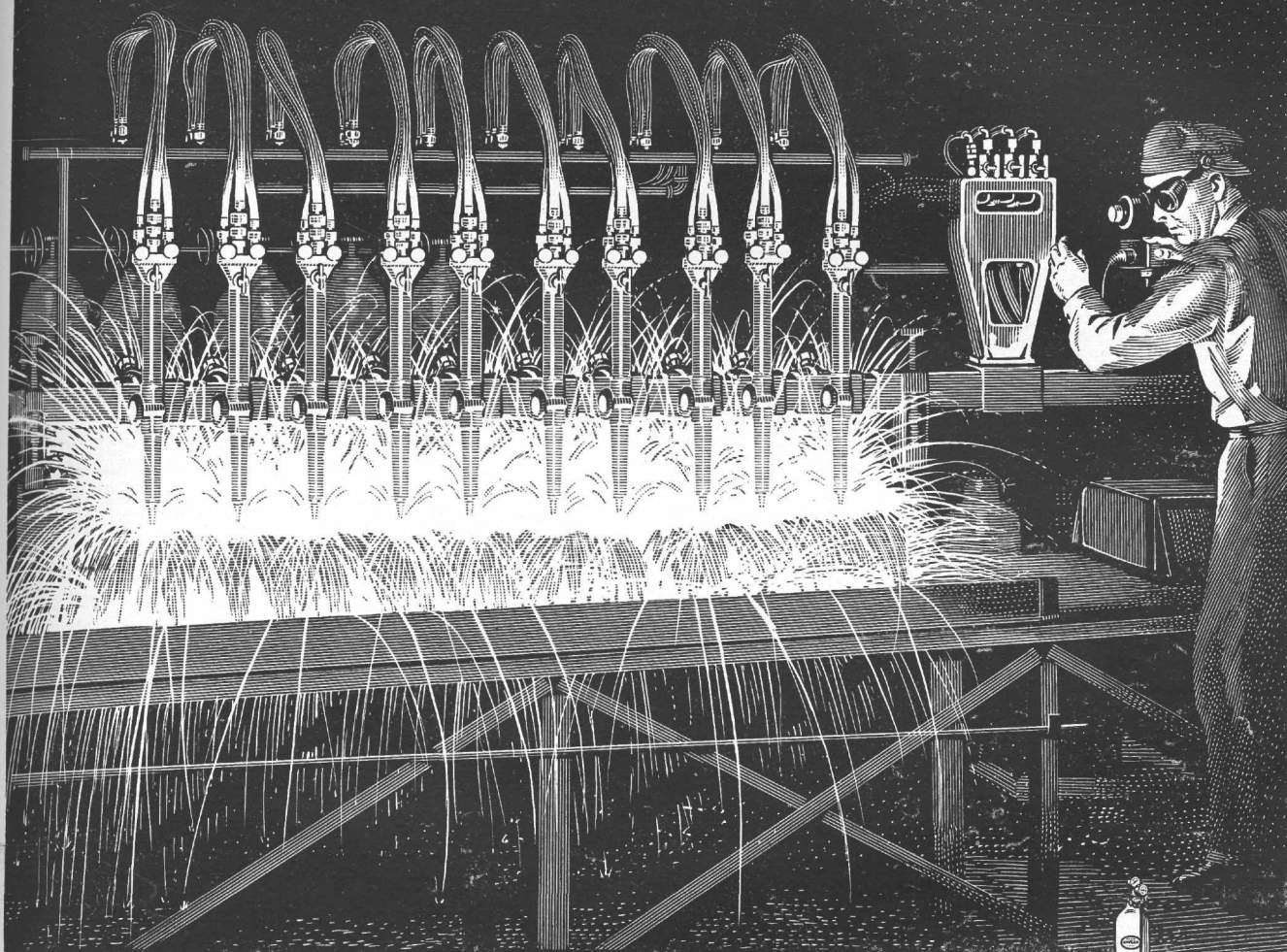
Easily operated indicator for temperatures of molten steel, both in the melting furnace and in the pouring ladle.

Temperature measuring device that will give readings from 1500-3000 degrees C. and above. Optical or radiation pyrometers, because of the gas atmosphere in the temperature pipes, produce erroneous readings.

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**A WEEK'S WORK EVERY DAY**



**T**UBULAR headers now race off the production line at Combustion Engineering Company's Chattanooga, Tenn. plant at the unprecedented rate of 100 a day — with the aid of this Airco 10 cutting torch Oxygraph. Compared to the 19 a day formerly produced, it's practically a week's work every day. This Airco oxyacetylene cutting machine is making metal-working history — never before was such an elaborate multiple torch arrangement deemed practicable. Yet, as perfected by Airco, every beneficial feature of

flame cutting is retained. Steel is accurately cut to the desired shape with amazing speed. And there is no time out for sharpening or regrinding.

New, faster, better ways of producing more planes, ships, tanks, guns and machines are made possible by the efficient and proper application of the oxyacetylene flame.

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**ANYTHING AND EVERYTHING FOR GAS WELDING OR CUTTING AND ARC WELDING**

November, 1942

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## RESEARCH OBJECTIVES

*(Continued from page 16)*

### **Paper**

A process of treating paper so as to make it impervious to moisture, or enable it to absorb moisture without swelling, would have a decided effect on the use of these materials.

### **Petroleum**

A lubricating oil having small change in viscosity over a wide range of temperature for service requiring free running lubrication through a range of temperature —45 degrees F. to + 150 degrees F.

### **Photography**

A photographic enlarging paper with the latitude of modern film negatives. A paper to faithfully reproduce the tone now present in the negative.

A method of producing prints in full color direct from original color transparencies in one operation.

### **Plastics**

Methods to eliminate the present costly plastic molding machines and molds.

Dielectric insulating material having very low losses at ultra high frequencies, be non-hygroscopic, non-brittle, and, if possible, reasonably flexible, have a melting point at least up in the red heat region, and have very low conductance for use in the radio industry.

Dielectric to take the place of mica, capable of withstanding high temperature.

Material similar to Micarta or Formica out of which to make gears or internal pump parts which will not absorb moisture.